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NSA - 0504
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27 September 1961

MEMORANDUM FOR : Chief, Development Branch, DDC-BD/P

SUBJECT : Potential Requirement for Close Look at Areas Picked Up by C***

1. PROBLEMS: There is a possibility that the current world situation, coupled with recent data acquired by C***, may generate orders to acquire more detailed data on certain selected areas.

2. ASSUMPTIONS:

(a) Vehicle: Existing birds from Edwards would be modified to increase altitude, speed, and/or range (in-flight refueling) as time permitted. Speed would remain about the same with emphasis on altitude for survival purposes.

(b) Coverage: Intelligence requirements would be for detailed coverage of relatively small areas of interest. Emphasis will be on maximum resolution or information content—quality rather than quantity.

(c) Lead data: I assume that three to six months would be required to develop techniques and equipment to increase the altitude capability. Political approval may be contingent upon this added survival capability.

3. DISCUSSION:

(a) Available Cameras:

(1) Hycon MR-733: Obviously we could use the existing MR cameras with the resulting data degraded only by the increase in altitude (decrease in scale), which would probably be very slight. We are currently getting 30 to 45 lines/mm on Film I film (8402/50-102) and plan testing under the "Med Dot" program on Pan I film (86-121/50-130). This new Pan I has the potential of resolving 65 lines/mm, which is about the limit of the lens. Hycon is proposing a

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new shutter arrangement to permit variable speeds between 1/75 to 1/300 T.O.F. This adds versatility to the "Y" camera. This system weighs about 4.6 pounds, including 6000' of thin base film (2 rolls at about 75 pounds each).

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(2) Modified IR-73B: [redacted] is modifying the "Y" cameras for the "U" program. He presently has one nearly completed and another due to be delivered in about one month. These cameras will not be better optically than the current model, but will be modified to operate in the new environment, the new speeds and altitudes. Therefore, this camera should not be considered.

(3) Eastman-Kodak "O" Camera: The prototype model of the "Y" camera is planned for test in the U-2 at Duxbury starting in October, depending on availability of a vehicle. A mount is being made by [redacted] to fit this instrument package into the existing "Y" bay. This prototype weighs about 510 pounds and can carry up to 5400 feet of film at 126 pounds (2 rolls at about 63 pounds each). This system comes as two separate cameras, therefore, one would be about 255 pounds and could carry 4200 feet of film. One camera could cover 20 degrees and operate at about 70% forward overlap. I mention one in the event the weight savings achieved is significant enough to warrant consideration. Obviously, two cameras with convergent-stereo would be much more desirable. However, one camera of this type could give a significant quality increase over the "Y" camera with a weight savings at the expense of lateral coverage. The high quality lens with a T stop of 6.1, opposed to the T 10 of the "Y" camera, can use high definition film (30-21/30-132) with an expected resolution capability of 100 lines/mm or better, down to about 10 degrees of sun angle. With Pan X film (30-121/30-130) this camera should give between 50 and 100 lines/mm down to about 3 degrees of sun angle. Testing at Duxbury will verify the operational capability. If we want testing of a single vertical, we would have to find Eastman-Kodak for a mount and some auxiliary items.

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(b) Tracker Camera: If the assumptions are correct, serious considerations should be given to eliminating the tracker and its associated hardware and wiring from the package. The basic camera is about 30 pounds and with film, mount, etc., a

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weight savings of about 70 pounds could be achieved.

(e) Processing: I have made no assumption concerning processing since it is only indirectly related to the basic problem; however, we will eventually be faced with a decision. NPIG has been called on frequently for technical support in a field type operation and, as a result, have just completed a study to provide a "fly-away kit." This kit would contain all of the necessary equipment and chemicals required to process and interpret 10 to 20 "Y" missions with resupply of expendables, as required, to extend the period. Everything is available to accomplish this end except the purchase of the continuous processing machine for high quality original film base film. The [redacted] has a new machine available to accomplish this objective. It can do high quality field processing and comes in modular sections for easy transport and set up (about 4 hours). It operates with a wide variety of available power or can work from a generator. The only missing item is water and it comes with a water filtration system. Also, it does not require an airconditioned environment. This processor will process and dry original and dupo films up to 9 1/2 inch width at about 35 feet/min. and includes its own drier. [redacted] from NPIG has been monitoring this development. A unit of this type could be delivered in about 30 days for a cost of approximately \$50,000. Apparently it is up to DE/NPO to purchase equipment for field use and it is recommended that this item be considered if the fly-away concept is still a potential operational requirement. This concept certainly offers a versatile "quick reaction capability" and should be very desirable from a security and cost standpoint over permanently installed facilities.

4. RECOMMENDATIONS

(a) Nycon should be directed to expedite submission of the proposal to provide a variable shutter speed for the "Y" camera. If possible, tests could be run in conjunction with the "Red Dot" series at Edwards.

(b) Every effort should be made to acquire a vehicle for the test of the Eastman-Kodak "Y" camera at Durban in both the convergent-stereo and single vertical configuration. A proposal should be solicited from Eastman-Kodak for test equipment required to check out the single vertical concept. This is also a part of the Red Dot series but sterilized from

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the Edwards program since it is for the "O" program. In the event it is decided to use this camera in the "T" program, I can see no serious security problems.

(a) In the interest of weight savings, the tracker should be eliminated and consideration given to using reduced film loads.

(d) DC/DP should provide about \$50,000 for the [redacted]
[redacted] "fly-away", high quality processor.

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cc: EPIC

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